

## GB1171735

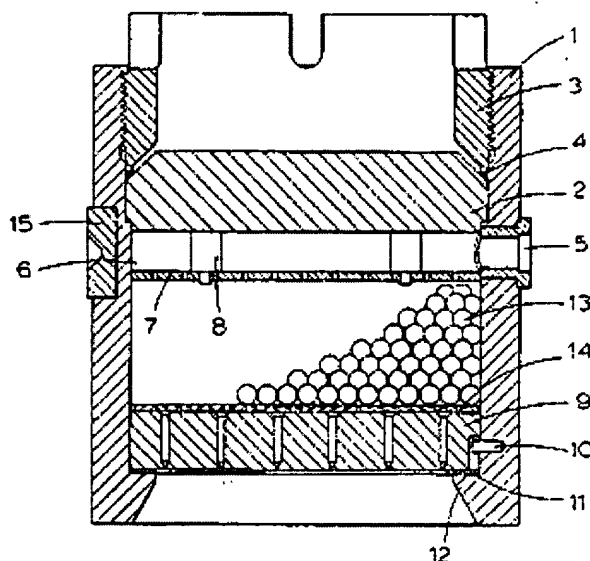
Patent number: GB1171735  
Publication date: 1969-11-26  
Inventor:  
Applicant:  
Classification:  
- International:  
- european: B29C47/68, D01D1/10D  
Application number: GBD1171735 19680827  
Priority number(s): DE19671660345 19671103

Also published as:

FR1590457 (A)  
ES359295 (A)  
CH475373 (A5)

### Abstract of GB1171735

1,171,735. Spinning pack. GLANZSTOFF A.G. 27 Aug., 1968 [3 Nov., 1967], No. 40832/68. Heading B5B. A spinning pack disposed on an apertured spinneret plate 9 includes a bed 13 of balls of material inert to the polymer melt, the balls having a diameter of 2 mm. to 12 mm., especially 7 mm. to 11 mm. The balls may all have substantially the same diameter, or the diameters of the largest and smallest balls may differ from one another by not more than 10%. Specified inert materials include ceramic, glass-ceramic, glass, quartz or metal, especially high-grade steel or noble metal. As shown, the balls rest on a filter pack 14, comprising rimless or rim-welded metal screens, which may be of different mesh sizes. Use of the pack is conducive to uniformity of residence time of different zones of the melt, and the appearance of cracks in the melt due to local overheating is substantially reduced.





## PATENT SPECIFICATION

DRAWINGS ATTACHED

1,171,735

Date of Application and filing Complete Specification:

27 Aug., 1968.

No. 40832/68.

Application made in Germany (No. P16 60 345.5)  
on 3 Nov., 1967.

Complete Specification Published: 26 Nov., 1969.

Index at Acceptance:—B5 B (1A2, 1A3, 2MY)

International Classification:—D 01 d 1/10

## COMPLETE SPECIFICATION

## Improvements in spinning packs.

We, GLANZSTOFF A.G., a body corporate organised and existing under the laws of Germany, of 5600, Wuppertal-Eilberfeld, Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

This invention relates to a spinning pack for use when spinning molten polymer through a spinning head comprising an apertured spinneret plate.

It is known when spinning molten polymers to use apparatus in which packs are disposed above the spinneret plate, which packs are intended to ensure the uniform distribution of the melt above the spinneret plate. Not only is it of exceptional importance that the pressure of the melt is uniform over the entire surface of the spinneret plate, but in addition care must be taken that the residence time of the melt inside the spinning head is constant. This presupposes an equal flow velocity over the entire cross-section of the spinning head through which the melt flows.

The spinning packs have the additional purpose of filtering the melt immediately before it passes through the fine spinneret apertures.

Perforated plates, frits consisting of various inert porous materials of pourable compositions are known as spinning packs, but these can all have certain disadvantages. Perforated plates, for example, always have dead zones between the separate holes, which are spaced relatively far from one another. This results in quite different residence times over the cross-section of the spinning head, and a poor mixing of the melt. Frits can only be used for spinning compositions of comparatively low viscosity, since otherwise too high a pressure has to be used. Finely divided materials have so far always been used, as pourable composi-

tions, advantageously sand or very small metal or glass balls, which are generally poured above a filter pack. However, it is found that sometimes these materials in time splinter and then clog the meshes of the filter pack or even the spinneret apertures. In addition, small glass or metal balls are difficult to clean.

We have now surprisingly found that considerable advantages, which will be more fully explained hereinafter, can be obtained by utilising a spinning pack according to the present invention. The present invention provides in for use with a spinning apparatus or frame for the production of filaments from polymer melts, the spinning apparatus or frame including at least one spinning head comprising an apertured spinneret plate, a spinning pack disposed on the apertured spinneret plate and including a bed of balls of material which is inert to the polymer melt intended to be passed through the spinning head, the balls having a diameter of from 2 mm to 12 mm.

Advantageously, the diameter of the balls is from 7 mm to 11 mm. They should preferably all have substantially the same diameter, or the diameters of the smallest and the largest balls should not differ by more than 10%. Such limitations lead to the most favourable flow conditions.

Particularly advantageous are ceramic balls which on the one hand are completely inert to polymer melts and on the other hand withstand large fluctuations in temperature without deterioration. Glass-ceramic, glass or quartz balls are however quite suitable. Metal balls may be utilised, it being advantageous to use those consisting of high-grade steels, which do not exert any catalytic influence on the polymer melt. Noble metal balls can also be employed, but they may be of less importance generally, on economic grounds.

The filter pack advantageously consists of

rimless or rim-welded metal screens instead of the usually employed screens having a marginal rim, beneath which melt which has developed cracks is possibly able to form.

5 It is optionally possible for screens of different mesh sizes to be arranged one above the other in one filter pack. The height of the bed of balls, the size of the latter and the number of screens, as well as their mesh sizes, are to be chosen according to the prevailing conditions.

As compared with spinning packs in which are used sand or similar finely divided pourable compositions, or exclusively filter plates, or combinations of sand, distributor plates and metal screens, the spinning pack according to the present invention has the advantage that there are no dead zones therein and as a consequence no excessively long and uneven residence times are produced for the melt. The appearance of cracks in the polymer melt due to local overheating is substantially suppressed when using the spinning pack according to the present invention. This is found to be particularly advantageous when the spinning arrangement has to be shut off for a short time for operational reasons. Whereas with many known spinning packs polymer which is clearly damaged discharges for a relatively long time on restarting the spinning operation, and the filaments have to be rejected, there is practically no waste when using the spinning pack according to the present invention.

A spinning pack according to the invention consisting of a filter pack and a bed of large balls can be used with particular advantage in relatively large spinning heads, such as those which are known for the production of spinning tows comprising from 400 to 800 separate filaments. These spinning heads have for example internal diameters of about 175 mm.

45 The present invention will now be described with reference to a specific embodiment shown by way of example in the accompanying drawing, the single figure of which is an axial section of a spinning head incorporating the present filter pack.

A cylindrical spinneret pot 1 is closed upwardly by a baffle plate 2 which is fixed in position by a screwed pipe 3 and a packing 4. An inlet 5 is located in the wall of the spinneret pot 1 and is in communication with a cylindrical space 6 below the baffle plate 2, the space 6 being closed by an apertured filter plate 7 which is held in relation to the baffle plate 2 by posts 8. The lower end of the spinneret pot 1 carries an apertured spinneret plate 9, the plate 9 being held in position by a locking pin 10. The

spinneret plate 9 is pressed against a packing ring 11 on an inwardly extending flange 12 of the spinneret pot 1. The space between the filter plate 7 and the spinneret plate 9 is filled with ceramic, glass ceramic, glass, quartz or metal balls 13 which do not react with the polymer melt to be passed through. All the balls have substantially the same diameter as the remaining balls. The balls rest on a filter pack 14. The whole assembly is held in the spinning apparatus (not shown) by means indicated at 15.

In use, polymer melt is introduced through the inlet 5, whereafter it passes through the filter plate 7, the bed of balls 13 and the filter pack 14, to be spun through the apertures or nozzles in the spinneret plate 9 to produce filaments.

#### WHAT WE CLAIM IS:—

1. In or for use with a spinning apparatus or frame for the production of filaments from polymer melts, the spinning apparatus or frame including at least one spinning head comprising an apertured spinneret plate, a spinning pack disposed on the apertured spinneret plate and including a bed of balls of material which is inert to the polymer melt intended to be passed through the spinning head, the balls having a diameter of from 2 mm to 12 mm.

2. A spinning pack according to claim 1, wherein the balls have a diameter from 7 mm to 11 mm.

3. A spinning pack according to either preceding claim, wherein the balls all have substantially the same diameter.

4. A spinning pack according to claim 1 or 2, wherein the diameters of the largest and the smallest balls do not differ from one another by more than 10%.

5. A spinning pack according to any preceding claim, further including a pack of rimless or rim-welded metal screens.

6. A spinning pack according to any preceding claim, wherein the balls are of ceramic, glass-ceramic, glass quartz or metal.

7. A spinning pack according to claim 1 substantially as described.

8. In or for use with a spinning apparatus or frame for the production of filaments from polymer melts, a spinning pack substantially as hereinbefore described with reference to the accompanying drawing.

ELKINGTON AND FIFE,

Chartered Patent Agents,

High Holborn House, 52-54 High Holborn,  
London, W.C.1.

Agents for the Applicants.

rimless or rim-welded metal screens instead of the usually employed screens having a marginal rim, beneath which melt which has developed cracks is possibly able to form.

- 5 It is optionally possible for screens of different mesh sizes to be arranged one above the other in one filter pack. The height of the bed of balls, the size of the latter and the number of screens, as well as their mesh sizes, are to be chosen according to the prevailing conditions.

- As compared with spinning packs in which are used sand or similar finely divided pourable compositions, or exclusively filter plates, or combinations of sand, distributor plates and metal screens, the spinning pack according to the present invention has the advantage that there are no dead zones therein and as a consequence no excessively long and uneven residence times are produced for the melt. The appearance of cracks in the polymer melt due to local overheating is substantially suppressed when using the spinning pack according to the present invention. This is found to be particularly advantageous when the spinning arrangement has to be shut off for a short time for operational reasons. Whereas with many known spinning packs polymer which is clearly damaged discharges for a relatively long time on restarting the spinning operation, and the filaments have to be rejected, there is practically no waste when using the spinning pack according to the present invention.

- A spinning pack according to the invention consisting of a filter pack and a bed of large balls can be used with particular advantage in relatively large spinning heads, such as those which are known for the production of spinning tows comprising from 400 to 800 separate filaments. These spinning heads have for example internal diameters of about 175 mm.

- 45 The present invention will now be described with reference to a specific embodiment shown by way of example in the accompanying drawing, the single figure of which is an axial section of a spinning head incorporating the present filter pack.

- A cylindrical spinneret pot 1 is closed upwardly by a baffle plate 2 which is fixed in position by a screwed pipe 3 and a packing 4. An inlet 5 is located in the wall of the spinneret pot 1 and is in communication with a cylindrical space 6 below the baffle plate 2, the space 6 being closed by an apertured filter plate 7 which is held in relation to the baffle plate 2 by posts 8. The lower end of the spinneret pot 1 carries an apertured spinneret plate 9, the plate 9 being held in position by a locking pin 10. The

spinneret plate 9 is pressed against a packing ring 11 on an inwardly extending flange 12 of the spinneret pot 1. The space between the filter plate 7 and the spinneret plate 9 is filled with ceramic, glass ceramic, glass, quartz or metal balls 13 which do not react with the polymer melt to be passed there-through. All the balls have substantially the same diameter as the remaining balls. The balls rest on a filter pack 14. The whole assembly is held in the spinning apparatus (not shown) by means indicated at 15.

In use, polymer melt is introduced through the inlet 5, whereafter it passes through the filter plate 7, the bed of balls 13 and the filter pack 14, to be spun through the apertures or nozzles in the spinneret plate 9 to produce filaments.

#### WHAT WE CLAIM IS:—

1. In or for use with a spinning apparatus or frame for the production of filaments from polymer melts, the spinning apparatus or frame including at least one spinning head comprising an apertured spinneret plate, a spinning pack disposed on the apertured spinneret plate and including a bed of balls of material which is inert to the polymer melt intended to be passed through the spinning head, the balls having a diameter of from 2 mm to 12 mm.
2. A spinning pack according to claim 1, wherein the balls have a diameter from 7 mm to 11 mm.
3. A spinning pack according to either preceding claim, wherein the balls all have substantially the same diameter.
4. A spinning pack according to claim 1 or 2, wherein the diameters of the largest and the smallest balls do not differ from one another by more than 10%.
5. A spinning pack according to any preceding claim, further including a pack of rimless or rim-welded metal screens.
6. A spinning pack according to any preceding claim, wherein the balls are of ceramic, glass-ceramic, glass quartz or metal.
7. A spinning pack according to claim 1 substantially as described.
8. In or for use with a spinning apparatus or frame for the production of filaments from polymer melts, a spinning pack substantially as hereinbefore described with reference to the accompanying drawing.

ELKINGTON AND FIFE,

Chartered Patent Agents,

High Holborn House, 52-54 High Holborn,  
London, W.C.1.

Agents for the Applicants.

